

**Assessment**

**Forest Plan Revision**

**Final Research Natural Areas  
and Special Interest Areas Report**

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## **Introduction**

A draft of this report was released for public review on November 30, 2016 and feedback was requested by January 6, 2017. Changes made to the final report based on public feedback were to add information about the potential need or opportunity for future Research Natural Areas.

Many tools and approaches are available to accomplish biodiversity conservation goals, from active management to designation of reserves. Research natural areas and special interest areas may provide long-term protection for biological elements of special concern, especially those with limited distributions such as rare plants and plant communities.

## **Research Natural Areas**

Research natural areas (FSM 4063.02) are permanently established to maintain representative areas of natural ecosystems and areas of special ecological significance. These protective designations attempt to maintain natural ecosystem components and processes and are cooperatively identified and managed with the USDA Forest Service Rocky Mountain Research Station. These areas form a long-term network of ecological reserves established as baseline areas for non-manipulative research, education, and the maintenance of biodiversity. They are administratively designated by the regional forester with station director concurrence. Research natural areas can and do play an important role in conservation strategies (Evenden et al. 2001).

Research natural areas are one component of a larger protected area network that includes land-use designations such as wilderness, botanical areas, and Bureau of Land Management areas of critical environmental concern. Research natural areas may be incorporated in research that addresses the representativeness of biological reserves, their role in biodiversity preservation, connectivity, and habitat fragmentation.

## **Special Interest Areas**

The purpose for special interest areas is to provide long-term protection to an area for scientific research and interpretation opportunities.

Objectives for the establishment of special interest areas include the area's protection and, where appropriate, to foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, paleontological, or other special characteristics. The objectives also include classifying areas that possess unusual recreation and scientific values so that these special values are available for public study, use or enjoyment.

## **Process, Methods and Existing Information Sources**

- A review of Forest Service policy for research natural areas and special interest areas was conducted (FSM 4063 and FSM 2370, respectively).
- A review of current research natural areas was conducted, including review of establishment records and decisions.
- A review of current special interest areas was conducted for the Bangtails Special Interest Area and the Black Sand Spring Creek Special Interest Area.
- A review was conducted of the regional unrepresented target plant associations that were identified in the 1986 forest plans. In addition, a review was conducted of the 1996 Regional (R1)

plant associations needing representation in the research natural area network (Chadde et al. 1996).

## Scale

The assessment area was the scale used as well as where targeted and potential unrepresented associations have been identified.

## Current Forest Plan Direction

Management direction for Custer research natural areas are found under Management Area L and other overlapping management areas such as H and I, and for Gallatin research natural areas and special interest areas direction is found under Management Area 21. The management goal for research natural areas is to provide areas for non-manipulative research, observation, and study of undisturbed ecosystems which typify important forest, shrubland, grassland, alpine, and aquatic communities.

The following standards apply to both Forest's RNA management area: Management of Research Natural Areas in wilderness will be consistent with wilderness goals. Wildlife habitat improvements are not permitted. Livestock grazing is not allowed unless permitted prior to research natural area and special interest area establishment. Research natural areas and special interest areas are classified as unsuitable for timber production. No measures will generally be undertaken for insect and disease management unless epidemic populations exist and adjacent lands are severely threatened. Recreation use is not to be encouraged. Trails will not be constructed within these areas. Applications for special use permits will be evaluated on a case-by-case basis. No special use occupancy will be permitted. No range improvement construction will be permitted. One or more fire management strategies may be considered and implemented for any unplanned wildland fire to achieve a variety of resource management objectives, while minimizing negative effects to life, investments and valuable resources. Fire management strategies for unplanned wildland fire will be responsive to the goals and objectives described for each management area as specified in the forest plan. Prescribed fire may be used to perpetuate the natural diversity of plant communities.

Custer Forest Plan Management Area L states that "Proposed and candidate research natural areas will be managed as research natural areas until classified. If proposed and candidate research natural areas are not classified the forest plan will be amended to assign them to another management area." Each research natural area's NEPA decision and corresponding forest plan amendment and establishment record may provide further direction tailored to the area.

Custer Forest Plan Management Area L will be recommended for withdrawal from locatable mineral entry (CNF FP, p. 79). The recommendation would be to avoid surface disturbance until the area is withdrawn from locatable mineral entry. The Custer forest plan directs that when application is made to lease, or existing leases expire or terminate a no surface occupancy stipulation will be applied to the new lease.

Both Line Creek Plateau and Lost Water Canyon Research Natural Areas overlap with portions of wilderness and Forest Service recommended wilderness. For the portion of the research natural area within Forest Service recommended wilderness (Management Area H), the forest plan goals and management standards for both Management Areas H and L apply. For the portion of the research natural area within designated wilderness (Management Area I), the forest plan goals and management standards for both Management Areas I and L apply. For the portion outside of Management Areas H and I, direction for research natural area Management Area L applies.

The management goal for Bangtail Special Interest Area is for the protection of unique botanical and paleontological values for study and public enjoyment. The management goal for Black Sand Springs Special Interest Area is for the protection of unique botanical values for study and public enjoyment.

## Existing Condition

There are 10 established research natural areas in the plan area, totaling 30,368 acres and two special interest areas totaling 3,773 acres. The following section lists established research natural areas and special interest areas located within the assessment area.

### Bridger, Bangtail, and Crazy Mountains (Montane Unit)

#### Bangtail Botanical and Paleontological Special Interest Area

**Location:** Bozeman Ranger District

**Date Established:** 2007

**Acres:** 3,366

**Elevation Range:** 7,000 – 7,980 feet

**Primary Features:** The area provides an excellent opportunity for vegetation ecology research and interpretation of important paleontological finds. It is also unique because it is accessible and has supported 30 years of research, thus providing valuable baseline data for present and future studies.

**Major Habitat Types, Communities, and Species:** There are mountain meadow and subalpine ecosystems and important paleontological resources. The area is representative of landscapes that extend from central Wyoming to northern Montana, and is comparable to bunchgrass ecosystems of Asia and the Andes.

### Madison, Gallatin and Beartooth Mountains (Montane Unit)<sup>1</sup>

#### Palace Butte Research Natural Area

**Location:** Bozeman Ranger District

**Date Established:** 1997

**Acres:** 1,280

**Elevation Range:** 7,200 – 10,333 feet

**Primary Features:** Subalpine wetlands, waterfalls, geologic features, subalpine forest and meadows.

**Major Habitat Types, Communities, and Species:** *Abies lasiocarpa*/*Galium triflorum*, *Abies lasiocarpa*/*Calamagrostis canadensis*, *Abies lasiocarpa*/*Vaccinium globulare*, *Picea Engelmann*/*Equisetum arvense*, *Salix wolfii*, *Phyllodoce empetriformis*, *Mimulus lewisii*, *Mertensia ciliate*, *Caltha leptosepala*, *Pinus albicaulis* *Abies lasiocarpa* krummholz, *Phyllodoce empetriformis*, *Senecio triangularis*, *Deschampsia cespitosa*, *Phleum alpinum*, and *Carex* spp.

#### Wheeler Ridge Research Natural Area

**Location:** Bozeman Ranger District

**Date Established:** 1998

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<sup>1</sup> Mt. Ellis on the Bozeman District was a proposed research natural area that, according to regional office files, was dropped due to recreational use.

**Acres:** 640

**Elevation Range:** 7,840 – 8,692 feet

**Primary Features:** Old growth whitebark pine

**Major Habitat Types, Communities, and Species:** *Abies lasiocarpa*/*Calamagrostis canadensis*, *Abies lasiocarpa*/*Vaccinium globulare*, *Abies lasiocarpa*/*Vaccinium scoparium*

### Black Butte Research Natural Area

**Location:** Hebgen Lake Ranger District

**Date Established:** 1998

**Acres:** 510

**Elevation Range:** 6,860 – 8,900 feet

**Primary Features:** Large, sometimes multiple-stemmed whitebark pine, dry subalpine forest *Abies lasiocarpa*, *Pinus albicaulis*, and *Festuca idahoensis* habitat types.

**Major Habitat Types, Communities, and Species:** *Abies lasiocarpa*/*Linnaea borealis* *Vaccinium scoparium* phase, *Abies lasiocarpa*/*Vaccinium scoparium* *Vaccinium scoparium* phase, *Abies lasiocarpa*/*Vaccinium scoparium* *Thalictrum occidentale* phase, *Abies lasiocarpa*/*Vaccinium globulare*, *Abies lasiocarpa* *Pinus albicaulis*/*Vaccinium scoparium*, *Pinus albicaulis*/*Vaccinium scoparium*.

### Obsidian Sands Research Natural Area

**Location:** Hebgen Lake Ranger District

**Date Established:** 1997

**Acres:** 390

**Elevation Range:** 6,860 – 8,900 feet

**Primary Features:** Excellent example of the lodgepole pine/bitterbrush habitat type on obsidian sand benchland.

**Major Habitat Types, Communities, and Species:** *Pinus contorta*/*Pushia tridentate*, *Arctostaphylos uva-ursi*, *Phlox multiflora*, *Antennaria microphylla*, *Lupinus* spp., *Crepis acuminata*, *Carex rossii*, *Sitanion hystrix*, *Danthonia intermedia*, *Poa nervosa*, *Agropyron spicatum*.

### Black Sand Spring Botanical Special Interest Area

**Location:** Hebgen Lake Ranger District

**Date Established:** 1997

**Acres:** 407

**Elevation Range:** 6,500 – 6,635 feet

**Primary Features:** The area includes Spring Creek riparian vegetation. Black Sand Spring Special Interest Area is adjacent to the Madison Fork Ranch Conservation Easement (The Nature Conservancy) and provides added value to the overall conservation of the ecological integrity around the South Fork of the Madison River.

**Major Habitat Types, Communities, and Species:** *Picea engelmannii*/*Equisetum arvense*, *Picea engelmannii*/*Calamagrostis canadensis*, *Pinus contorta*/*Purshia tridentate*, *Salix geyeriana*/*Carex rostrata*, *Salix geyeriana*/*Deschampsia cespitosa*, *Festuca idahoensis*-*Agropyron caninum*, *Salix wolfii*

### East Fork of Mill Creek Research Natural Area

**Location:** Yellowstone (Livingston) Ranger District

**Date Established:** 1997

**Acres:** 882

**Elevation Range:** 5,938 – 8,184 feet

**Primary Features:** Engelmann spruce and Douglas-fir with whitebark pine understory.

**Major Habitat Types, Communities, and Species:** *Pseudotsuqa menziesii*/*Physocarpus malvaceus*, *Pseudotsuqa menziesii*/*Carex geyeri*, *pseudotsuqa menziesii*/*Linnaea borealis*, *Picea engelmannii*/*Cornus stolonifera*, *Picea Engelmannii*/*Linnaea borealis*, *Abies lasiocarpa*/*Vaccinium globulare*, *Festuca idahoensis*, *Agropyron caninum*.

### Passage Creek Research Natural Area

**Location:** Yellowstone (Livingston) Ranger District

**Date Established:** 1997

**Acres:** 1,112

**Elevation Range:** 6,400 – 8,950 feet

**Primary Features:** Engelmann spruce, Douglas-fir, and subalpine fir upland and riparian forests.

**Major Habitat Types, Communities, and Species:** *Abies lasiocarpa*/*Pinus albicaulis*-*Vaccinium scoparium*, *Abies lasiocarpa*/*Carex geyeri*, *Abies lasiocarpa*/*Vaccinium globulare*, *Abies lasiocarpa*/*Linnaea borealis*, *Abies lasiocarpa*/*Calamagrostis rubescens*, *Picea engelmannii*/*Physocarpus malvaceus*, *Pseudotsuga menziesii*/*Linnaea borealis*, *Pseudotsuga menziesii*/*Physocarpus malvaceus*, *Pseudotsuga menziesii*/*Carex geyeri*, *Festuca Idahoensis*/*Agropyron caninum*, *Artemisia tridentata*/*Festuca Idahoensis*, *Abies lasiocarpa*/*Equisetum arvense*, *Abies lasiocarpa*/*Galium triflorum*, *Glycerla borealis*

### Sliding Mountain Research Natural Area

**Location:** Yellowstone (Livingston) Ranger District

**Date Established:** 1997

**Acres:** 1,459

**Elevation Range:** 6,280 – 9,303 feet

**Primary Features:** Encompassing the watersheds of two first-order drainages, most of the research natural area is forested, primarily by spruce, subalpine fir, lodgepole pine, and Douglas-fir. A sizable shrubland and grassland is present. Dominant species include mountain big sagebrush, Idaho fescue, and bluebunch wheatgrass. Several avalanche chutes occur on the north face of Sliding Mountain.

**Major Habitat Types, Communities, and Species:** *Pseudotsuqa menziesii*/*Physocarpus malvaceus*, *Pseudotsuqa menziesii*/*Spiraea betulifolia*, *Picea*/*Physocarpus malvaceus*, *Picea*/*Galium triflorum*, *Picea*/*Linnaea borealis*, *Abies lasiocarpa*/*Linnaea borealis*, *Abies lasiocarpa*/*Vaccinium globulare*, *Abies lasiocarpa*/*Vaccinium scoparium*, *Abies lasiocarpa*/*Alnus sinuate*, *Artemisia tridentata*/*Festuca idahoensis*, *Festuca idahoensis*/*Agropyron caninum*.

## Line Creek Plateau Research Natural Area

**Location:** Beartooth Ranger District, MT; Clark's Fork Ranger District of the Shoshone National Forest, WY

**Date Established:** 2008

**Acres:** 22,422 (19,369 Custer Gallatin and 3,053 Shoshone National Forest)

**Elevation Range:** 7,400 – 10,892 feet

**Primary Features:** Extensive areas of alpine tundra vegetation, a cirque basin with alpine lakes and ponds, and many unique plant species. Nine alpine, seven coniferous, and one shrubland vegetation type fulfill requirements for the Northern Region Research Natural Area network.

**Major Habitat Types, Communities, and Species:** *Pinus albicaulis*, *Abies lasiocarpa* - *Pinus albicaulis* *Vaccinium scoparium*, *Abies lasiocarpa*/*Vaccinium scoparium*, *Abies lasiocarpa*/*Arnica cordifolia*, *Pseudotsuga menziesii*/*Physocarpus malvaceus*, *Pseudotsuga menziesii*/*Juniperus communis*, *Pinus flexilis*/*Festuca idahoensis*, *Artemisia tridentata*/*Festuca idahoensis*, *Festuca idahoensis*/*Geum rossii*, *Carex elynoides*, *Carex scirpoidea*/*Geum rossii*, *Dryan octopetala*/*Carex rupestris*, *Juncus drummondii*/*antennaria lanata*, *Salix glauca*/*Deschampsia cespitosa*, *Salix planifolia*/*Carex paysonis*, *Salix planifolia*/*Carex scopulorum* *Festuca brachyphylla*-*Trisetum spicatum*, *Deschampsia cespitosa*/*Caltha leptospeala*, *Hesperocloa kingie*.

## Lost Water Canyon Research Natural Area

**Location:** Beartooth Ranger District

**Date Established:** 1994

**Acres:** 3,645

**Elevation Range:** 363 – 3,550 feet

**Primary Features:** Encompasses nearly an entire watershed in pristine condition.

**Major Habitat Types, Communities, and Species:** *Pseudotsuga menziesii*/*Festuca idahoensis*, *Pseudotsuga menziesii*/*Physocarpus malvaceus*, *Pseudotsuga menziesii*/*Carex geyerii*, *Agies lasiocarpa*/*Clematis columbiana*, *Abies lasiocarpa*/*Ribes montigenum*, *Shoshonea pulvinata*.

## Ashland District (Pine Savanna Unit)

### Poker Jim Research Natural Area

**Location:** Ashland Ranger District

**Date Established:** 1974

**Acres:** 363

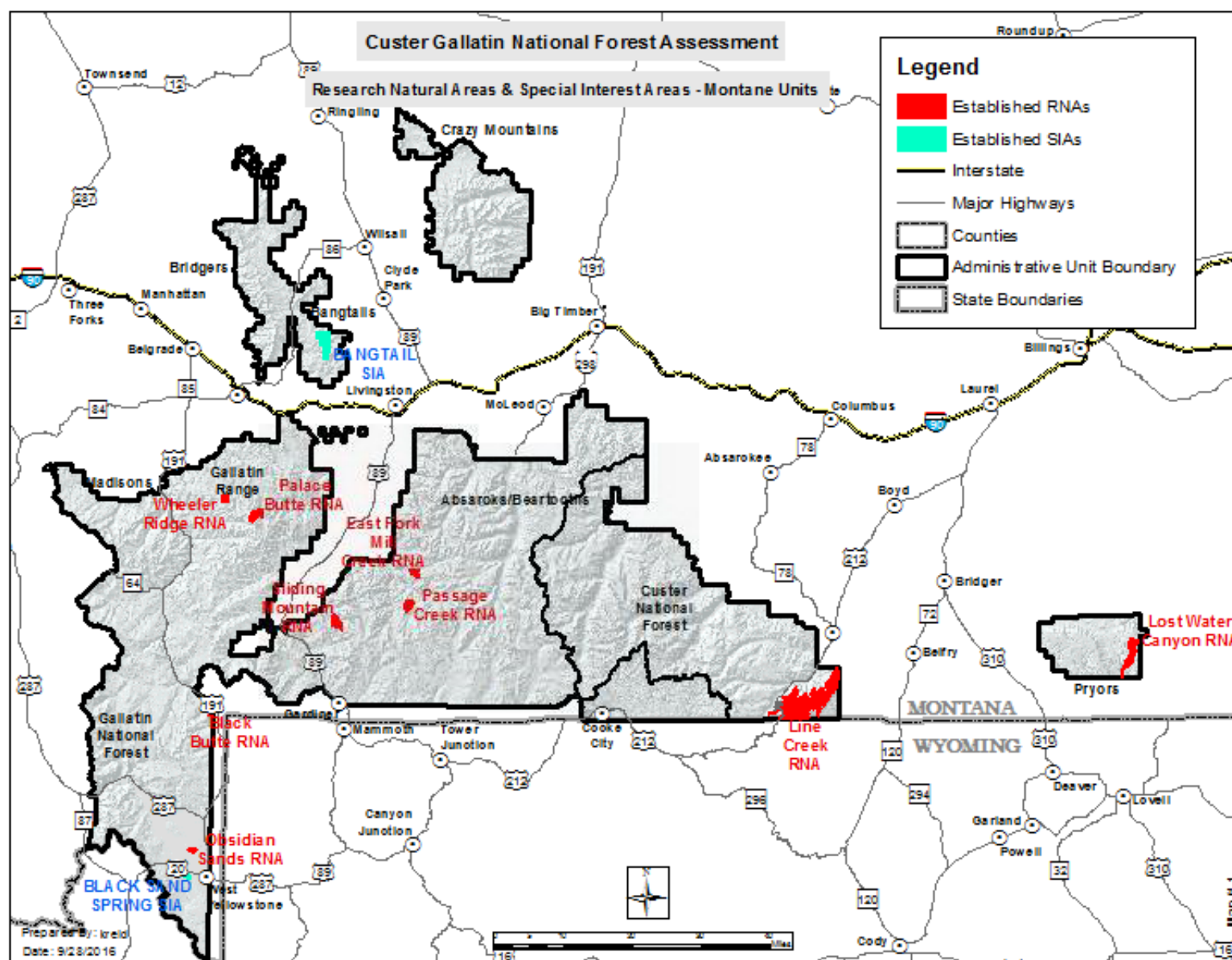
**Elevation Range:** 3,550 – 4,075 feet

**Primary Features:** Eastern ponderosa pine forest; native grassland and shrubland communities dominated by big sagebrush, silver sagebrush and wheatgrasses.

**Major Habitat Types, Communities, and Species:** *Pinus ponderosa*, *Artemisia tridentata*, *Artemisia cana*, *Agropyron spicatum*, *Agropyron smithii*.

Figure 1 and Figure 2 display established research natural areas and special interest areas.





**Figure 1. Established research natural areas (RNAs) and special interest areas (SIAs) – Montane Units**

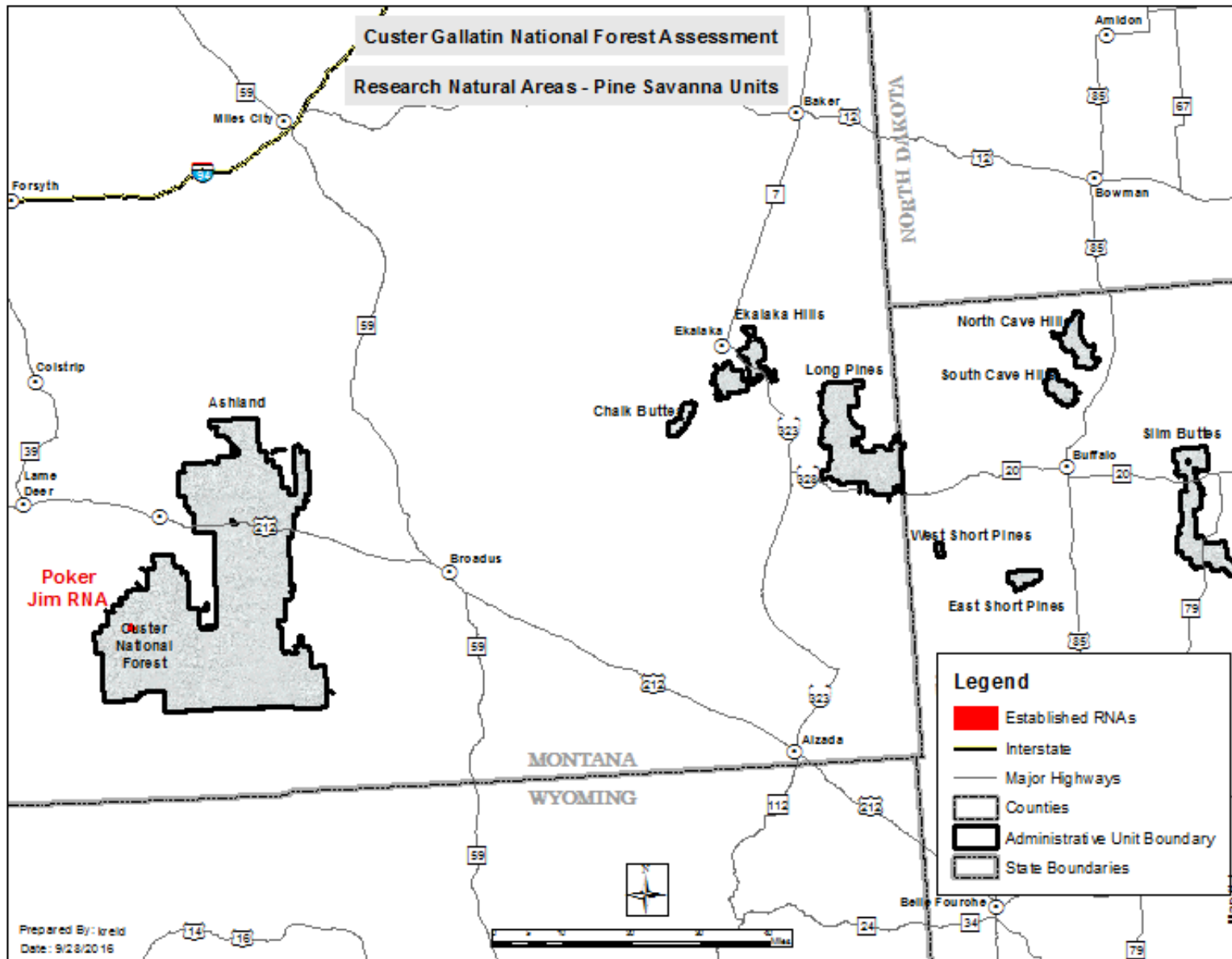


Figure 2. Established research natural areas (RNAs) – Pine Savanna Units

There are four steps in the creation of research natural areas. Nominated research natural areas are categorized as the first step in which an area is submitted for initial review. If it is deemed worthy of designation it becomes a candidate research natural area (the second step). Candidate research natural areas are geographic areas identified with no formal action on a proposal. Proposed research natural areas (the third step) have formally been submitted for approval (the fourth step). The proposed research natural areas identified in the 1986 Custer and Gallatin forest plans have since undergone environmental analysis, and have been formally approved and established as research natural areas.

Two candidate research natural areas, Deer Draw and White Rock Springs, were identified for the Sioux District and have not been pursued for designation for a variety of reasons. Deer Draw (approximately 15 acres) on the South Dakota portion of the Sioux District was originally proposed as a candidate research natural area in 1982 to protect the habitat of two small mammals—white-footed mouse and meadow jumping mouse. The 1986/1987 Custer forest plan also indicates “special faunal populations” as being the targeted element of interest. Currently the state of South Dakota does not consider either species as rare and neither species is a Northern Region sensitive species. Since then, the objective for the research natural area delineation in Deer Draw refocused on community types as targeted by a 1993-1996 regional review of underrepresented community types. The targeted community types include green ash forest and woodland alliance, ponderosa pine forest, and mixed-grass Pine Savanna, all of which occur in the Deer Draw. The Deer Draw area is in the Road Draw Allotment which has received livestock use since the turn of the 20th century and conditions are not considered pristine or near pristine which is a selection criteria for research natural areas. There are currently no Forest Service natural area examples of the Green Ash Forest & Woodland Alliance, but sites dominated by green ash are present in several U.S. Fish and Wildlife Service research natural areas along the Missouri River in eastern Montana (Chadde et al. 1996).

White Rock Springs on the Montana portion of the Sioux District (about 60 acres) was listed as a candidate research natural area as a representative of beaver pond aquatic type in Montana. No records have been located for this candidate area. White Rock Springs was not mentioned in the Northern Region 1996 review of underrepresented types (Chadde et al. 1996). The category of “ponds” are the current classification in which beaver ponds fit. There are currently 19 Northern Region research natural areas that have ponds less than 20 acres (Chadde et al. 1996).

Deer Creek and White Rock Springs are recommended for removal as candidate research natural areas during forest plan revision. New candidate research natural areas or special interest areas meeting selection criteria could be considered based upon local knowledge of vegetation types or identified rare elements and features.

Most of the targeted communities identified during the development of the 1986 forest plans have been filled through applicable environmental analyses and decisions. Additional areas representing later recommended additions to the regional research natural area (Chadde 1996) would be evaluated during the life of the revised plan.

## **Stressors**

Uncharacteristic fuels loads are likely to occur in some research natural or special interest areas. Unnatural fuel loads in these systems could be disruptive to the biological integrity for which they were designated. Invasive species are known to occur in the following areas (Table 1). Invasive species control in and around these areas are important due to the high value placed on the biological integrity of these designated areas. Bangtail Special Interest Area has the largest portion of infestation while the remainder had no to minor infestations.

**Table 1. Noxious weed infestations in research natural areas (RNA) and special interest areas (SIA) in the Montane Units of the Bridger, Bangtail, and Crazy Mountains**

Area	Net Acres Invasive Plants	Percent of RNA/SIA Infested	Species Present
Bangtail SIA (3,366 acres)	447	13%	Houndstongue, nodding plumeless thistle, Canada thistle, common mullein, spotted knapweed, and common tansy

**Table 2. Noxious weed infestations in research natural areas (RNA) and special interest areas (SIA) in the Montane Units of the Madison, Henry, Gallatin and Absaroka Beartooth Mountains**

Area	Net Acres Invasive Plants	Percent of RNA/SIA Infested	Species Present
Black Sand Spring SIA (407 acres)	1	<1%	Butter and eggs, Canada thistle hoary alyssum, and spotted knapweed
Obsidian Sands RNA (390 acres)	Trace	Trace	Butter and eggs
East Fork Mill Creek RNA (882 acres)	5	<1%	Canada thistle, houndstongue, oxeye daisy, and spotted knapweed
Sliding Mountain RNA (1459 acres)	2	<1%	Canada thistle and Dalmatian toadflax
Line Creek RNA (19,369 acres)	8	<1%	Spotted knapweed and Canada thistle

**Table 3. Noxious weed infestations in research natural areas and (RNA) and special interest areas (SIA) in the Pine Savanna Units of the Ashland District**

Area	Net Acres Invasive Plants	Percent of RNA/SIA Infested	Species Present
Poker Jim RNA	Trace	Trace	Cheatgrass and houndstongue

Six research natural areas have recently experienced wildfire effects with near to entire burn-through in Obsidian Sands and Passage Creek Research Natural Areas. (Table 4) These areas will still be retained as research natural areas and allowed to recover through natural succession. These situations also offer research opportunities. In the case of Obsidian Sands, most of the research natural area was burned, and yellow toadflax (“butter and eggs”) is a high weed risk so monitoring is important.

**Table 4. Wildfire burn severity acreage by research natural area (RNA)**

RNA	Wildfire Year	Low	Moderate	High	Grand Total	RNA Total Acres	% RNA Burned
East Fork Mill Creek RNA	2007	126	99	208	434	882	49%
Line Creek RNA	2011	544	411	809	1,763	22,422	8%
Lost Water Canyon RNA	2002	2			2	3,645	Trace
Obsidian Sands RNA	2007	29	351	9	390	390	100%
Passage Creek RNA	2007	227	392	348	967	1,112	87%
Sliding Mountain RNA	2013	96	157	294	546	1,459	37%

In 1974 when Poker Jim Research Natural Area was established on the Ashland District, it was recognized that the components of the area appeared to be slightly altered due to human-initiated activities. At the

time it was classified as secondary range on the West O'Dell allotment due to the lack of water. Plans were to fence out the research natural area to exclude livestock grazing but that was never done. The area continues to be grazed each year. The green ash/chokecherry in the area would border on "at risk" to healthy, and does contain flowing water in channels. The rough scoria outcrops are sites that occupy cheatgrass, which competes with the ponderosa pine/bluebunch wheatgrass for which the area was set aside. Kentucky bluegrass and houndstongue, however, are prevalent in the system.

## Key Benefits to People

Research natural areas and special interest areas contribute to research, education, and maintenance of biological diversity at several scales. Research natural areas can serve as excellent locations for the collection of control information for long-term ecological monitoring, basic ecosystem research, population and demographic studies, and research of ecological processes and ecosystem function. They function as gene reservoirs of rare or endangered species as well as other wild species. In addition, they are often a component of a larger protected area for landscape ecology research. See the Social and Economics report (Larson 2017) for further detail.

## Trends and Drivers

Successional status of RNA/SIA habitat components may have changed due to a few factors. The role of disturbance is not fully understood in relation to succession. There are some disturbance factors, though, that are known to affect areas at the landscape level.

Past fire suppression has affected ecological conditions in some of the research natural areas (such as Poker Jim Research Natural Area, S. Studiner, Pers. Comm.). Colonization of forest vegetation into openings and meadows is one example of change in a target element. When ecological processes such as fire are altered or absent, ecological conditions are likely to move away from the natural range of variation without appropriate management in research natural areas.

Trends in climate have the potential to affect existing RNAs/SIAs in the coming years if it is not already affecting them. Changes in vegetation composition and structure of target elements and even loss of the target element communities is possible depending on the degree and direction of climate change. This does not diminish their value as baseline reference areas though, and in fact increases it.

Invasive species will likely continue to spread on the Custer Gallatin, potentially entering research natural areas in some areas. The overall lack of ground-disturbing activities and external vectors, like vehicles, horses, and people, provide some resistance to invasion. Wildlife and wind can also carry non-native seeds into these areas. There is a restriction to the majority of activities within research natural areas, including weed spraying, without permission from the Rocky Mountain Research Station. The overall trend for weed spread is up. Inventoried weed acreage in the assessment area has doubled in the past decade.

Whitebark pine, lodgepole pine, Douglas fir, ponderosa pine and other species have been impacted by various insects and pathogens. Research natural areas are not immune to these impacts. Areas that have been set aside specifically for their forested component have the potential to be affected by insects and disease. The level of mortality on infested acres varies depending on host conditions; in some areas, only a few trees have been killed, while in others several trees are killed. Table 5 displays the agents known to affect disease and mortality in research natural areas.

**Table 5. Agents known to affect tree mortality and disease in research natural areas (RNA)**

RNA	Conifer Mortality Agent or Defoliator Agent
Black Butte RNA	Douglas- fir beetle; Mountain pine beetle (all host species of lodgepole pine, ponderosa pine, limber pine, and whitebark pine); and white pine blister rust
East Fork Mill Creek RNA	Mountain pine beetle (all host species of lodgepole pine, ponderosa pine, limber pine, and whitebark pine)
Line Creek RNA	Mountain pine beetle (all host species of lodgepole pine, ponderosa pine, limber pine, and whitebark pine); Douglas-fir beetle; spruce budworm; and subalpine fir mortality
Lost Water Canyon RNA	Douglas- fir beetle. Mountain pine beetle (all host species of lodgepole pine, ponderosa pine, limber pine); and subalpine fir mortality
Obsidian Sands RNA	Fire
Palace Butte RNA	Mountain pine beetle (all host species of lodgepole pine, ponderosa pine, limber pine, and whitebark pine); spruce budworm; and subalpine fir mortality
Passage Creek RNA	Mountain pine beetle (all host species of lodgepole pine, ponderosa pine, limber pine, and whitebark pine); and subalpine fir mortality
Poker Jim RNA	Mountain pine beetle (ponderosa pine) and pine engraver (ponderosa pine)
Sliding Mountain RNA	Mountain pine beetle (all host species of lodgepole pine, ponderosa pine, limber pine, and whitebark pine);
Wheeler Ridge RNA	Mountain pine beetle (all host species of lodgepole pine, ponderosa pine, limber pine, and whitebark pine); and subalpine fir mortality

Another disturbance factor is recreation. Although recreation is discouraged in research natural areas, there can be roads or trails through an area or an adjacent recreation site. This proximity can lead to unmanaged recreation such as OHV use, firewood cutting, recreational grazing, etc. These impacts can degrade an area and affect its baseline and research values. A national forest system trail occurs in Line Creek Plateau Research Natural Area. Impacts from associated recreational use are largely confined to the trail itself and not to the resource values for which the research natural area was established.

## Potential Need and Opportunity for Additional Designated Areas

Original research natural area target assignments for plant associations on the national forests in the Northern Region were given in the 1983 Regional Planning Guide. The Northern Region Status and Needs Assessment for Research Natural Areas (Chadde et al. 1996) updated the planning guide, and recommended additional unrepresented plant associations on each national forest in Region 1 so that the entire range of associations in the Northern Region might be represented in the research natural area network.

The recommendations provided in Chadde et al. (1996) will need thorough review to prioritize associations as far as what is present or appropriate on the ground. This will require not only closer review of the documents, but long-term field review and assessment followed by appropriate decisions. Given time and resource limitations, most of this effort will necessarily come after completion of the forest plan revision.

Table 6 identifies those unrepresented plant associations within the plan area that should be considered in future designation of research natural areas within the plan area.

Table 6. Plant associations currently unrepresented (Chadde et al. 1996)

Forest Portion	Common Name	Scientific Name	Likely Location	Priority
Former Custer	Green ash (American elm) / chokecherry series	Fraxinus pennsylvanica-(Ulmus americana) / Prunus virginiana series	South Dakota	Moderate
	Green ash / chokecherry	Fraxinus pennsylvanica/Prunus virginiana	eastern Montana and South Dakota	High
	Green ash / western snowberry	Fraxinus pennsylvanica / Symphoricarpos occidentalis	South Dakota	Moderate
	Rocky Mountain juniper / bluebunch wheatgrass	Juniperus scopulorum/Agropyron spicatum	central-eastern Montana	Moderate
	Ponderosa pine / bluebunch wheatgrass	Pinus ponderosa/Agropyron spicatum	Represented in Poker Jim RNA	High
	Ponderosa pine / sun sedge	Pinus ponderosa/Carex heliophila	Ashland/Sioux	High
	Ponderosa pine / Idaho fescue	Pinus ponderosa/Festuca idahoensis	Ashland/Beartooth	High
	Ponderosa pine / common juniper	Pinus ponderosa/Juniperus communis	Sioux RD, se Montana, nw South Dakota	Moderate
	Ponderosa pine / chokecherry	Pinus ponderosa/Prunus virginiana	Represented in Poker Jim RNA	High
	Narrowleaf cottonwood / red osier dogwood	Populus angustifolia/Cornus stolonifera	central Montana	Moderate
	Eastern cottonwood/ red osier dogwood	Populus deltoides/Cornus stolonifera	central-eastern Montana	Moderate
	Aspen communities	Populus tremuloides communities	All units	Moderate
	Silver sage / western wheatgrass	Artemisia cana/Agropyron smithii	Ashland/Sioux	Moderate
	Silver sage / Idaho fescue	Artemisia cana/Festuca idahoensis	Ashland/Sioux	Moderate
	Big sagebrush / western wheatgrass	Artemisia tridentata/Agropyron smithii	Ashland/Sioux	Moderate

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Forest Portion	Common Name	Scientific Name	Likely Location	Priority
	Big sagebrush / bluebunch wheatgrass	Artemisia tridentata/Agropyron spicatum	All units	Moderate
	Big sagebrush / Four-wind saltbush	Artemisia tridentata - Atriplex confertifolia	South-central and eastern MT	Moderate
	Shrubby cinquefoil / little bluestem	Potentilla fruticosa/Andropogon scoparius (Schizachyrium scoparium)	Ashland	High
	Fragrant sumac / bluebunch wheatgrass	Rhus aromatica/Agropyron spicatum	All units	Moderate
	Fragrant sumac / Idaho fescue	Rhus aromatica/Festuca idahoensis	Ashland / Beartooth	Moderate
	Fragrant sumac / plains muhly	Rhus aromatica/Muhlenbergia cuspidata	Ashland/Sioux	Moderate
	Greasewood / western wheatgrass	Sarcobatus vermiculatus/Agropyron smithii	Ashland/Sioux	Moderate
	Greasewood / bluebunch wheatgrass	Sarcobatus vermiculatus/Agropyron spicatum	Ashland/Sioux	Moderate
	Silver buffaloberry	Shepherdia argentea	Ashland/Sioux	Moderate
	Western snowberry	Symphoricarpos occidentalis	All units	Moderate
	Low sagebrush / western wheatgrass	Artemisia arbuscula/Agropyron smithii	South Dakota	Moderate
	Low sagebrush / bluebunch wheatgrass	Artemisia arbuscula/Agropyron spicatum	All units	Moderate
	Creeping juniper / little bluestem	Juniperus horizontalis/Andropogon scoparius (Schizachyrium scoparium)	Ashland/Sioux	Moderate
	Creeping juniper - sun sedge	Juniperus horizontalis/Carex heliophila	Ashland/Sioux	Moderate
	Western wheatgrass – threadleaf sedge	Agropyron smithii - Carex filifolia	South Dakota	Moderate
	Bluebunch wheatgrass / western wheatgrass	Agropyron spicatum - Agropyron smithii	Ashland	High
	Bluebunch wheatgrass – sideoats grama	Agropyron spicatum - Bouteloua curtipendula	Ashland	High
	Bluebunch wheatgrass – threadleaf sedge	Agropyron spicatum - Carex filifolia	Ashland	High
	Big bluestem	Andropogon gerardii	Ashland/Sioux	High
	Sand bluestem	Andropogon hallii	Ashland/Sioux	Moderate



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Forest Portion	Common Name	Scientific Name	Likely Location	Priority
	Mountain sedge	Carex scopulorum	May be present in Line Creek and/or Lost Water RNAs	Moderate
	Salt grass	Distichlis spicata	Ashland/Sioux	Moderate
	Idaho fescue – sun sedge	Festuca idahoensis - Carex heliophila	Ashland	High
		Scirpus acutus	Ashland/Sioux	Moderate
		Spartina pectinata	Ashland/Sioux	Moderate
		Stipa comata - Carex filifolia	Ashland/Sioux	Moderate
		Scirpus acutus	Ashland/Sioux	Moderate
		Typha latifolia	Ashland/Sioux	Moderate
Former Gallatin	Low sagebrush / western wheatgrass	Artemisia arbuscula/Agropyron smithii	All units	Moderate
	Low sagebrush / bluebunch wheatgrass	Artemisia arbuscula/Agropyron spicatum	All units	Moderate
	Low sagebrush / Idaho fescue	Artemisia arbuscula/Festuca idahoensis	All units	Moderate
	Shrubby cinquefoil / Idaho fescu	Potentilla fruticosa/Festuca idahoensis	All units	High
	Bluebunch wheatgrass – blue grama	Agropyron spicatum-Bouteloua gracilis	Gardiner	High
	Idaho fescue – Richardson's needlegrass	Festuca idahoensis - Stipa richardsonii	All units	High

## Key Findings

New candidate research natural areas or special interest areas meeting selection criteria could be considered based upon local knowledge of vegetation types or identified rare elements and features. Field surveys would be needed to identify candidate sites that could fill any new regional targets.

There are 10 established research natural areas in the plan area, totaling 30,368 acres. There are two special interest areas that have received formal designation, totaling 3,773 acres.

Due to the high value for biological integrity of these designated areas, invasive species control in and around these areas are important. Uncharacteristic fuel loads in these designated areas could be disruptive to the biological integrity for which research natural areas and special interest areas were designated.

Manipulative management in research natural areas for restoration and habitat maintenance purposes of the vegetation types for which the areas were established to represent, such as prescribed fire, invasive plant control, or understory thinning, must obtain approval from the Research Station Director and National Forest Supervisor (FSM 4063). Such management in special interest areas do not need this level of approval and could be prioritized with routine district weed management.

Poker Jim Research Natural Area likely does not provide optimum conditions for which it was set aside and further review is warranted to determine whether stewardship management can restore the features for which the area was established.

Most of the targeted communities identified during the development of the 1986 forest plans have been filled through applicable NEPA analyses and decisions. Additional areas representing later recommended additions to the regional research natural area targets (Chadde 1996) would be evaluated during the life of the revised plan.

Two candidate research natural areas on the Sioux District (Deer Draw and White Rock Springs) are recommended for removal as candidates as they do not meet selection criteria found in FSM 4063.

## Information Needs

**Forest Plan Information Needs:** None identified.

**Long-term Information Needs:** Uncharacteristic fuel loads and invasive species in these systems could be disruptive to the biological integrity for which they were designated. There is a need for a fuel condition inventory and an updated invasive species inventory.

There is a need to inventory conditions in the Poker Jim Research Natural Area to see if management actions can restore the area for which it was set aside or if it should be removed from the system.

Field surveys would be needed to identify candidate sites that could fill any new regional targets.

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